ATOMIC AND MOLECULAR EMISSIONS FROM JUPITER'S POLES

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Abstract

Auroral atomic and molecular emissions from Jupiter's polar regions have been identified now over a range from soft X-rays into the Mid-Infrared, with a conspicuous gap in detection at visible wavelengths. X-ray and ultraviolet emissions on Jupiter are indisputably auroral in origin, taking "auroral" to mean "directly excited by non-thermal high-energy particle impact", as the photon energies involved (> 7.7 eV) are much greater than any equilibrium thermal process in Jupiter's atmosphere. Emissions in the infrared involve thermal energies which are not unexceptional, but which are identified as auroral due to the morphology of the emitting region. Taken together, the wide range of auroral emissions has a lot to tell us about the aurora as a sink for energetic particles from the Jovian magnetosphere and about the influence of the auroral energy deposition on Jupiter's stratospheric structure. Technical difficulties, however, have prevented getting the maximum return from comparative observations at many photon energies. Information which has been obtained from Jupiter's multi-wavelength auroral emission will be discussed, as well as identifying some important observational studies which remain to be done and the nature of the problems they would address.

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